

REMARKS

1. Amendments to the claims

Claims 1, 3-6, 10 and 11 are pending in the application. With the present response Applicants add new claims 12 to 17. Support for new claims 12 and 15 can be found, for example, at page on page 4 lines 1 to 21, at page 4 line 23 to page 5 line 2 and page 8 line 13 to page 9 line 11. Support for new claims 13 and 16 can be found, for example, on page 4 lines 1 to 21 and page 8 line 13 to page 9 line 11.

Support for new claims 14 and 17 can be found, for example, at page 9 line 13 to page 10 line 3.

2. 35 USC 103 (a)

2.1 In section 2 of the Final Action mailed January 21, 2010, the Examiner still rejects claims 1 and 3-6 under 35 USC 103(a) as being unpatentable over Glushko in view of Bawendi and further in view of Fuller. The Examiner also rejects claim 10 on the basis of Glushko, Bawendi and Metz. Finally, the Examiner rejects claim 11 on the basis of Glushko, Bawendi and Wenzel.

2.2 In section 5 of the Final Action, the Examiner opines that Applicants' first and second arguments filed on December 1st, 2009 are not persuasive.

2.3 Applicants respectfully disagree with the Examiner's opinion for the following reasons.

In particular, with regard to the second Applicants' argument, Applicants note that in the Final Action the Examiner does not provide any substantial counterargument to the following Applicants' submission presented by Applicants in the previous response:

"Although such collective information can be provided by quantum dots on supports, there is no teaching, in Bawendi, of singling out each support. See, for example, column 7, line 65: "After selection of a particular collection of quantum dot composition and sizes as

discussed above to associate with an item of interest." See also column 12, lines 54-56: "correlating the spectral emissions 55 to a collection of quantum dots which encode a particular item of interest." Therefore, there is no teaching, in Bawendi, that each bead can be seen as an entity separated by the others. Even Figure 5 of Bawendi, mentioned by the Examiner, clearly shows aggregation of the various beads (hatched circles 100)."

Applicants respectfully ask the Examiner to show where does Bawendi teach how to break and separate the collective information provided in Bawendi into separate beads to be inserted into the cells of Glushko. Separation of the collective information of Bawendi would clearly and impermissibly frustrate the principle of operation of Bawendi, see MPEP 2143.01 (V).

In fact, an alleged separation of the collection of quantum dots (size distributions of semiconductor nanocrystals) would inevitably affect and modify the characteristic spectral emissions (of that collection of quantum dots) and therefore would nullify the tracking of the location of a particular item of interest or the identification of a particular item of interest.

2.4 In addition, Applicants observe that claim 1 and claim 11 specify that "*a plurality of*" "*nanometer beads filled with nanometer sized particles*" are placed in "*a plurality of data pit locations*", "*the nanometer sized particles providing colors to each nanometer bead*".

Therefore, according to claim 1 or claim 11, "*the data pit locations*" are adapted to receive "*a plurality of beads filled with nanometer sized particles*" (i.e. the "*plurality of beads*" are adapted to be placed in data pit locations), wherein the nanometer beads are provided with a corresponding color.

Glushko discloses the use of fluorescent molecules (see for example column 6 lines 10 to 60) placed in cells. It clearly appears that the cells of Glushko, being adapted for receiving molecules, are unadapted to receive a "*a plurality of beads filled with nanometer sized particles*".

Turning now to Bawendi, Bawendi discloses (emphasis added)

- a) "a "barcode" comprising one or more particle size distributions of semiconductor nanocrystals (quantum dots) having characteristic spectral emissions to either "track" the location of a particular item of interest or to identify a particular item of interest. The semiconductor nanocrystals used in the "barcoding" scheme can be tuned to a desired wavelength to produce a characteristic spectral emission by changing the composition and size of the quantum dot." (see column 3 lines 23 to 33 of Bawendi);
- b) "As discussed above, the selection of the composition of the quantum dot, as well as the size of the quantum dot, affects the characteristic spectral emission wavelength of the quantum dot. Thus, as one of ordinary skill in the art will realize, a particular composition of a quantum dot as listed above will be selected based upon the spectral region being monitored." (column 6 lines 28 to 32 of Bawendi);
- c) "After selection of a particular collection of quantum dot composition and sizes as discussed above to associate with an item of interest, the quantum dots can be attached to, embedded within or associated with that particular item of interest. As one of ordinary skill in the art will realize, the item of interest must be sufficiently reactive with the surface of the quantum dot, or must be sufficiently compatible with the quantum dot."(see column 7 line 65 to column 8 line 5 of Bawendi).
- d) "the quantum dots can be readily attached to a solid support... Exemplary solid supports include ...beads" (see column 14, lines 15-50 of Bawendi)

After having read the entire specification of Bawendi and in particular the above exemplary passages a) to d), Applicants note that Bawendi specifically focuses on a barcode comprising one or more particle size distributions of semiconductor nanocrystals (quantum dots), which are capable of emitting a determined spectrum of emission. In particular, Bawendi focuses on quantum dots having specific composition and size and teaches that only a modification in size or in composition of the nanocrystals affects the spectrum of emission.

In addition, Bawendi (passage c) reported above specifies that each barcode, i.e. each size distribution of semiconductor nanocrystals, is associated (by way of a surface reaction) to a particular item of interest to either "track" the location of this item of interest or to identify this

item of interest. Passage d) further discloses that "the quantum dots can be readily attached to a solid support... Exemplary solid supports include ...beads".

It follows that Bawendi focuses on one or more predefined particle size distributions of semiconductor nanocrystals (fully attached to a solid-support-bead and having specific composition), and on a strict correlation between one item of interest and the one or more predefined particle size distributions of semiconductor nanocrystals.

In other words, Bawendi discloses the use of one or more size distributions of semiconductor nanocrystals and the association between one item of interest and one or more corresponding size distributions of semiconductor nanocrystals.

Taking into account the relevance of this strict association, in Bawendi the one or more size distributions of semiconductor nanocrystals are adapted to be placed in one location (the item of interest) and are intended globally as a unique combination of quantum dots to produce a unique spectral emission that is indicative of the particular item or component of interest (column 5, lines 45-62).

Starting from these observations, where does Bawendi give an indication to provide "*a plurality of nanometer beads filled with nanometer sized particles*" and to place this "*plurality of nanometer beads filled with nanometer sized particles*" in "*a plurality of data pit locations*"?

In other words, Applicants respectfully ask the Examiner to show to Applicants where does Bawendi provide an indication to dislocate "*a plurality of nanometer beads filled with nanometer sized particles*" in "*a plurality of data pit locations*".

2.5 In addition, Applicants provide the following arguments.

As already explained above, Bawendi discloses a barcode scheme which is formed by way of a unique combination of quantum dots to produce a unique spectral emission. In fact, Bawendi discloses that only a modification in size or in composition of the nanocrystals affects the spectrum of emission (see column 3 lines 21 to 33).

Hence, the "spectral emission" of Bawendi provides a collective luminescence information of a composition to uniquely identify or locate an item of interest.

In other words, as shown column 3 lines 21 to 33, Bawendi discloses that "the semiconductor nanocrystals used in the "barcoding" scheme can be tuned to a desired wavelength to produce a characteristic spectral emission..".

Applicants were not able to find in Bawendi any indications or teachings about "*measuring*" the "*fluorescence of*" "*a plurality of nanometer beads at each location to identify presence and absence of*" respective "*colors*".

Where does Bawendi show that a determined color is searched for in the spectral emission of each nanometer bead to verify whether the color is present or not? In other words, where is Bawendi showing or teaching an investigation about "*presence and absence of*" respective "*colors*".?

In addition, where is the indication that such a spectral emission is used in Bawendi so that "*the nanometer sized particles provid[e] colors to each nanometer bead*"? (emphasis added)

2.6 Applicants further note that investigation about "*presence and absence of*" respective "*colors*" is connected with the purpose of the present application to increase storage capacity of data pit location.

In particular, as explained in the summary of the present application, when "*a plurality of beads filled with nanometer sized particles*" are placed in a "*plurality of data pit locations*", corresponding colors are detectable. Therefore, predefined colors may be present or absent in a data pit location, providing a number of states of information in the data pit locations, thereby increasing storage capacity of pit only systems by a predefined factor.

On the contrary, as already mentioned above, Bawendi provides only a collective luminescence information (i.e. only a single state of information) of a composition to uniquely identify or locate an item of interest. Hence, Bawendi does not provide at all any increase of a storage capacity of pit only systems.

These considerations further confirm again that, differently from the Examiner's opinion, the quantum dots of the present invention do not essentially do the same thing that Bawendi discloses.

2.7 In view of all of the previously presented considerations, Applicants submit that a person skilled in the art would not be motivated at all to combine the disclosure of Glushko, which discloses data pit location unadapted to receive "*a plurality of nanometer beads filled with nanometer sized particles*" with Bawendi which fails any indications of "*placing a plurality of nanometer beads filled with nanometer sized particles*" "*using inkjet technology*" "*at each of a plurality of data pit locations*" and any step of "*measuring*" "*fluorescence of*" "*a plurality of nanometer beads*" "*at each location to identify presence and absence of said colors*".

Hence, Applicants submit that claims 1, 3-6, 10 and 11 are patentable.

3. (new claims)

3.1 With the present response, Applicants add new claims 12 and 15 to recite "*wherein placing a plurality of nanometer beads at each of a plurality of data pit locations comprises placing a plurality of*" "*different*" "*nanometer beads*" and provide the following additional arguments.

In particular, according to claims 12 and 15, "*a plurality of*" "*different*" (for example three) "beads" are placed "*in a same data pit location*" and corresponding different colors (for example three colors - provided by the nanometer sized particles of each bead) are detectable. Therefore, by way of example, three different colors may be present or absent in the same data pit location, providing eight binary states of information (000 to 111) in the same data pit location, thereby increasing storage capacity of pit only systems by a factor of eight.

On the contrary, there is no indication in Bawendi to provide "*different beads in a same data pit location*" to increase storage capacity. As already mentioned above in paragraphs 2.3, 2.4, 2.5,

2.6 Bawendi provides only a collective luminescence information (i.e. only a single state of information) of a composition to uniquely identify or locate an item of interest.

3.2 With the present response, Applicants also add new claims 13, 14, 16 and 17.

Claims 13 and 16 recite that "*the beads placed in the same data pit location are colored with different colors*". Claim 14 and 17 recite that "*the beads placed in the same data pit location are colored with different shades of a color*".

All of claims 13, 14, 16 and 17 are based on a color differentiation among the beads placed in the same data pit location.

Applicants submit that Bawendi teaches away not only from any "*different*" "*beads*" "*in a same data pit location*" (as explained above at paragraph 3.1), but also does not indicate that the beads of the same data pit location are of "*different colors*" or of "*different shades of a color*".

The reasons are as follows.

In particular, following the previous example of the three beads reported above at paragraph 3.1, Applicants observe that according to the content of either claim 13 and 16 or claim 14 and 17, the three "*beads*" placed "*in the same data pit location*", provide three "*different*" detectable colors or three "*different*" detectable "*shades of a color*" (provided by the nanometer sized particles of each bead). Therefore, by way of example, three different colors or three "*different*" detectable "*shades of a color*" may be present or absent in each data pit location, providing eight binary states of information (000 to 111) in the same data pit location, thereby increasing storage capacity of pit only systems by a factor of eight.

This consideration confirms again that the present application, differently from Bawendi, allows an the increase of a storage capacity with respect pit only systems and does not essentially do the same thing as Bawendi discloses.

4. (requests)

In view of the above, reconsideration and allowance of all the claims are respectfully solicited.

5. (fees)

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 50-4194. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection herewith may be charged to deposit account no. 50-4194. Please ensure that the Attorney Docket Number is referred to when charging any payments or crediting any overpayments for this case.

I hereby certify that this correspondence is
being electronically transmitted on

Respectfully submitted,

April 14, 2010
(date of deposit)
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